

How does  
a blind person  
get around?



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“How can a person get around when he can’t see where he’s going?”



This question is asked in a variety of ways — sometimes in amazement, sometimes in disbelief, often in hope. It embodies the concerns of many people — the newly-blind person himself, the parents of a blind child who want him to lead as normal a life as possible, the family whose elderly grandmother is losing her sight, the teacher who has a blind child in class for the first time, the employer interviewing a blind applicant, and anyone who sees a blind person on the street and casually wonders why some blind people use canes and others use dogs, or maybe even why some blind people seem to get around better than others.

This booklet describes how blind people can and do get around, how they learn to do it, the techniques they use as they go from place to place and the importance to many of them of being able to travel. It also traces how in the past few decades, through a growing awareness of the importance of mobility and the consequent development of safe systems of travel, many blind people for the first time have the opportunity to really be on their own as much as they want. The travel skills of blind persons are commonly divided into two parts: the first, referring to the use of the remaining senses to establish one’s position and relationship to other objects in the environment, is called *orientation*; the second, referring to one’s actual locomotion from a starting point to a desired location in another part of the environment, is called *mobility*.

This is not a do-it-yourself guide to mobility, but rather a description of the realities of mobility as they exist today and the possibilities for the future.

“Getting around independently means to me the realization of that which has been said very frequently by others, that life is movement and involvement and that one needs to be able to move about, in and out, and for me at least, to be self-directing in that movement — to go where I want to go, when I want to go, how I want to go.”

— *Social scientist blinded in World War II*

These words zero in on a daily issue in blind people’s lives — mobility. A person who can see takes for granted that he can go from one place to another on his own. The choices of where, when, and how are his own. For a blind person these choices are his own only to the extent that he can get around by himself, to the extent that he has learned the skills and mastered the techniques involved in traveling without sight. For



“It’s just a whole new world that opens up for you...”



those born blind (the congenital blind), the lack of independent mobility may be one of the major limitations of blindness. For those who have lost their sight at some point during their lives (the adventitious blind), the loss of mobility can be at first one of the most devastating and overwhelming effects of blindness.

How well a blind person learns to get around can affect many other aspects of his life—self-concept, self-confidence, personal and social relationships, and educational and employment opportunities.

### **What does getting around mean?**

A 75-year-old man, who has recently lost his sight from an age-related disease may have limited goals, perhaps only to walk about the house without help and without hurting himself. To a blind eight-year-old, it may mean knowing his way around his school and schoolyard. To a person with a severe visual handicap, it may mean being able to use his remaining vision more efficiently. To an increasing number of blind and severely visually handicapped men, women, and teenagers, it means the ability to travel confidently and safely when and where they choose.

“It’s just a whole new world that opens up for you, because when you don’t travel and you can’t travel, you have to depend on sighted people to take you places and that could be very difficult sometimes.”

— *Congenitally blind young woman who has recently completed mobility training*

### **How many blind people are there in the United States?**

Although people generally think of blindness as total lack of sight, definitions vary. Many states consider “legally” blind (and therefore eligible for rehabilitation and other services) anyone whose visual acuity is 20/200 in the better eye with correcting lenses—that is, he can see at 20 feet with maximum correction no more than that which a person with normal vision can see at 200 feet or his angle of vision is 20 degrees or less. According to this definition, there are about 450,000 legally blind people.

A more realistic and practical definition based on visual ability—how well a person uses what vision he has—has been suggested recently by the American Foundation for the Blind. According to this definition, as of 1972 there were an estimated 1.7 million Americans who have severe visual handicaps ranging from total blindness to the inability to read newsprint even with corrective glasses. Of these, fewer than 25 percent are totally blind or have no useful vision. Only about three percent, or 60,000, are in school or of preschool age. Approximately 65 percent of the severely visually





impaired are 65 or older. The incidence of blindness increases with age because of the growing population of elderly persons and our longer life expectancy, which carries with it a higher rate of blindness from such age-related diseases as glaucoma, cataracts, general systemic illness, and retinal deterioration.

### **Can all blind and visually handicapped people get around?**

Most visually handicapped persons can achieve some sense of orientation to their surroundings and some degree of mobility. How much depends on a complex set of physical, psychological, and social factors unique to each individual. Among the most significant are the person's motivation and his immediate goals. The nature of the visual impairment is also involved—the cause of the blindness, whether it is total or partial, the amount and type of vision if any, and whether the blindness was congenital or adventitious. The existence of another handicap such as mental retardation, emotional disturbance, neurological disorder, deafness, or cerebral palsy is also a factor. Other considerations may be the person's age and general health; life experience and concept development; the amount of support, encouragement, and acceptance he receives from family and friends; the quality of the rehabilitation experience; and, perhaps most significant, whether orientation and mobility training is taken.

### **Can a visually impaired person with some sight use it for mobility?**

Whatever sight a person has can and should be used. Someone with light projection has a point of reference that a totally blind person lacks. A person who can distinguish forms and shapes or who sees only a foot ahead has the means of perceiving some visual cues. In many cases, those persons with some useful vision can increase their efficiency in using their sight. In some cases, powerful lenses and training in their use can enhance a person's ability to orient himself. In certain instances, these lenses may be the only mobility aid required.

### **What is involved in getting around independently?**

Like anyone else, a visually handicapped person has to know where he is in terms of his immediate surroundings. He must have an idea of where he is going and the direction in which it lies. Without sight, or without enough to guide him, he has to make maximum use of his other senses and correctly use a travel aid, usually a cane or a dog guide, that carries out at least some of the functions of sight in providing information about the surroundings and protection from harm.



# A person must organize and process the information his senses pick up.

## **How does a blind person use his other senses?**

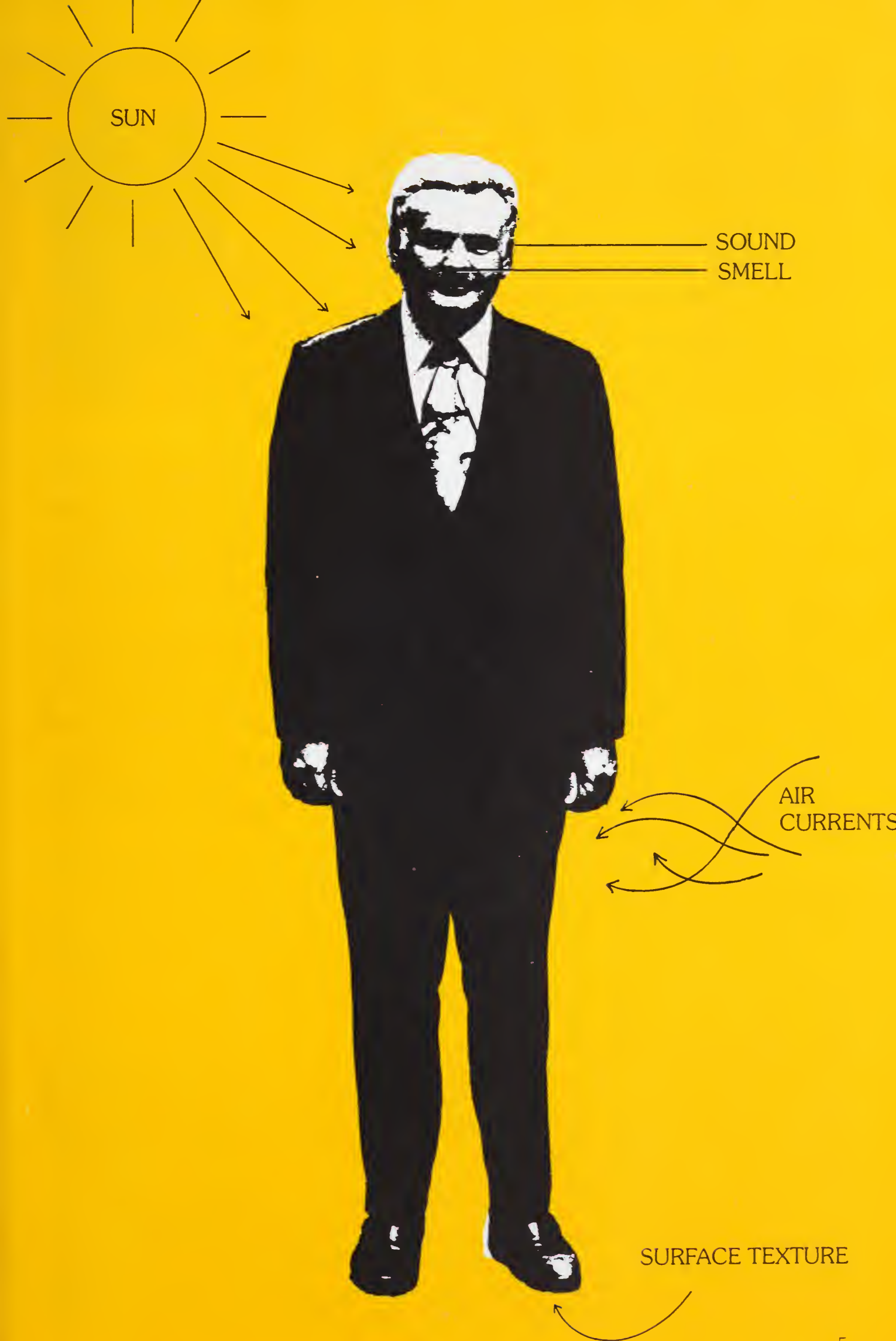
The senses are the body's guidance system. Equilibrium and kinesthesia—the feeling of movement of muscles, tendons, and joints—orient the body in space.

People who can see often rely on sight for many things they could learn through their other senses. For example, a person reaches into his pocket and feels two small coins, one with a smooth edge, the other slightly smaller with a rough edge. He knows that the smooth-edged coin is a penny, the other a dime, but he will probably look to make sure.

Without this integrative, all-embracing sense of sight a person must organize and process the information his senses pick up through another framework. It must be one that will provide a reasonably reliable and realistic impression of the environment and a basis for analysis and intellectual judgement. Here the major difference between the congenital blind and the adventitious blind becomes apparent. A person born blind or who became blind too young to have any visual memory coordinates his sensory perceptions through the interaction of his remaining senses. An adventitiously blinded person also relies on this kind of sensory orientation but within the framework of his visual memory. He knows what things look like and by visualization can check on the impressions he receives through his other senses. He remembers what a chair looks like, while to a congenital blind person a chair may be the sum of its shape, size, density, texture, and other spatial qualities.

A common misconception about blind people is that they have more acute hearing or more sensitive touch than sighted persons, even that they have some mysterious sixth sense to guide them. None of this is true. Many do, however, through necessity and training, usually develop their other senses to a greater extent. Such sensory development is vital to successful mobility.

Hearing provides information on identification, direction, distance, size, and structure. A blind person learns to recognize and identify sounds and to discriminate and select those that are important and useful. He also learns to localize sounds and to use sound reflection, sound shadows, and echo location. One aspect of this is a curious and little-understood phenomenon called "object perception." This is the ability that can be developed by anyone who can hear, whether sighted or blind, of perceiving extremely close objects by seemingly feeling a change of sensation or pressure on the face. This phenomenon does not involve light or touch, but sounds so slight as to be almost imperceptible.





# The sighted guide, dog guide, cane and electronic guide.



Touch involves anything touched by any part of the body and anything that touches the body. Through it one can learn about the size, weight, volume, density, texture, and surface of an object. An important facet of touch is the sensation of temperature—the breeze against the skin, the blast of cold air from an open window in winter, the change in air current as space opens up at the end of a row of tall buildings, or the drop in temperature under a tree or canopy on a sunny day.

The characteristic odors of the bakery, the restaurant, and the fishmarket become olfactory landmarks outdoors, just as the mustiness of books in a bookcase, the sweetness of flowers on the living room table, and the flat airlessness of a plastic shower curtain are indoor olfactory landmarks. Taste is closely linked with smell, but it does not play a key role in orientation and mobility.

Kinesthesia is useful in the detection of gradients, lateral tilts in surfaces, estimation of distances, and in the awareness of position, movement, and posture. Equilibrium is vital in that it involves balance and turning.

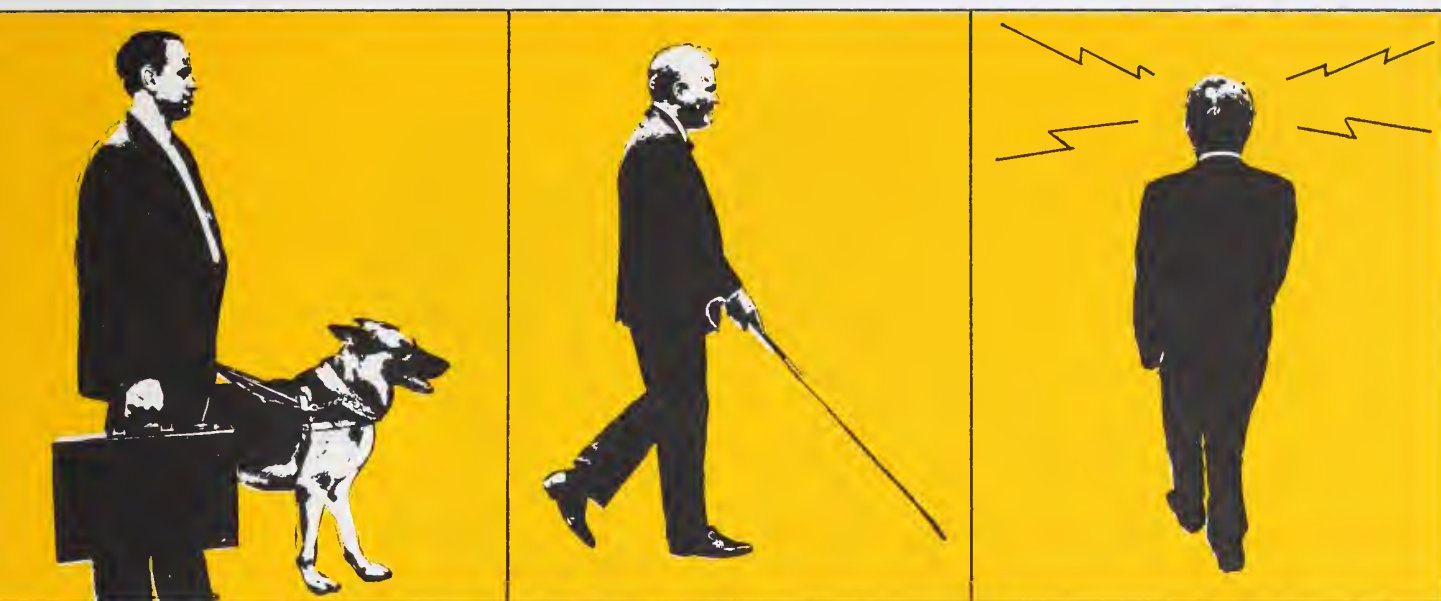
Complex sensory information is obtained through the interaction of the senses. The tactile discrimination of shape and form occurs through the kinesthetic movement of the hand reaching out to feel a piece of sculpture and the touch of the hand upon it. Kinesthesia makes many of the habitual activities of daily life automatic. A blind person relies on it for knowing where his foot is so he can put his shoe on, as well as for getting from the living room to the kitchen without counting steps.

## **What about travel aids?**

Blind people generally use sighted guides, dog guides, or a variety of models of long, or prescription, canes. Some older blind people still use the white wooden cane. Several electronic devices are in the design and field testing stages but will not be available for widespread distribution for some time. They are intended only to complement, not replace, the cane.

Choice of mode of travel is personal, based on the needs, lifestyle, age, and capabilities of the individual, but is often influenced by professionals and relatives. The cane and the dog guide are the aids associated with independent mobility. The cane provides a wealth of detail about the environment but no protection from over-hanging obstacles, while the dog provides few environmental details but a faster travel speed.





### **The sighted guide**

Every blind person at one time or another gets around with the assistance of a sighted guide. For some, going about with another person may provide whatever mobility they want or need. A blind child who gets around by himself at home and at school may rely on family and friends to take him places. Even the person who travels independently with a long cane or a dog guide will on occasion prefer to take the arm of a sighted companion—while walking to a table in a restaurant, Christmas shopping in a crowded department store, at a theater or concert hall, or crossing a busy intersection. In fact, the proper use of a sighted guide is the first lesson in mobility training.

When walking with a sighted person, the blind person walks about half a step behind, firmly holding the sighted person's arm just above the elbow. The blind person can then feel and easily follow the guide's movements up, down, straight, left, right, etc. Since so many blind people will encounter a well-meaning person who grabs his elbow and propels him dangerously ahead into traffic, the technique for breaking that grip is also taught.

### **The dog guide**

Dog guides provide protection, a safe, speedy means of travel, and companionship. They may be male or female and usually are shepherds, boxers, golden and Labrador retrievers, or collies, all breeds noted for their intelligence, potential for training, and stable disposition.

The dog undergoes intensive training before being matched with a blind person. It is taught to respond to such basic commands as "sit," "stay," "left," "right," and "forward"; to respond appropriately to curbs, pedestrians, and traffic; and to protect its master from low-hanging objects. The dog learns to adjust to and cope with heavy traffic, crowded streets, and the presence of other animals; to move around obstacles, to deal with elevators and revolving doors. Most important, it learns what is known as intelligent disobedience—refusing a "forward" command when there is danger, such as an approaching car.

The blind person and the dog train together for about four weeks to become an effective team. The dog wears a U-shaped harness, a leash, and a choke collar. The master walks to the right holding the center of the harness and the leash in his left hand. Whenever the dog is on duty the master holds the harness through which he follows its lead. Otherwise he holds the dog by the leash alone. The leash also serves







a disciplinary purpose. When the dog makes a mistake the master corrects it with a sharp tug on the leash, momentarily tightening the collar. This may occasionally startle an onlooker, but it is the recommended method of keeping the dog's performance up to par.

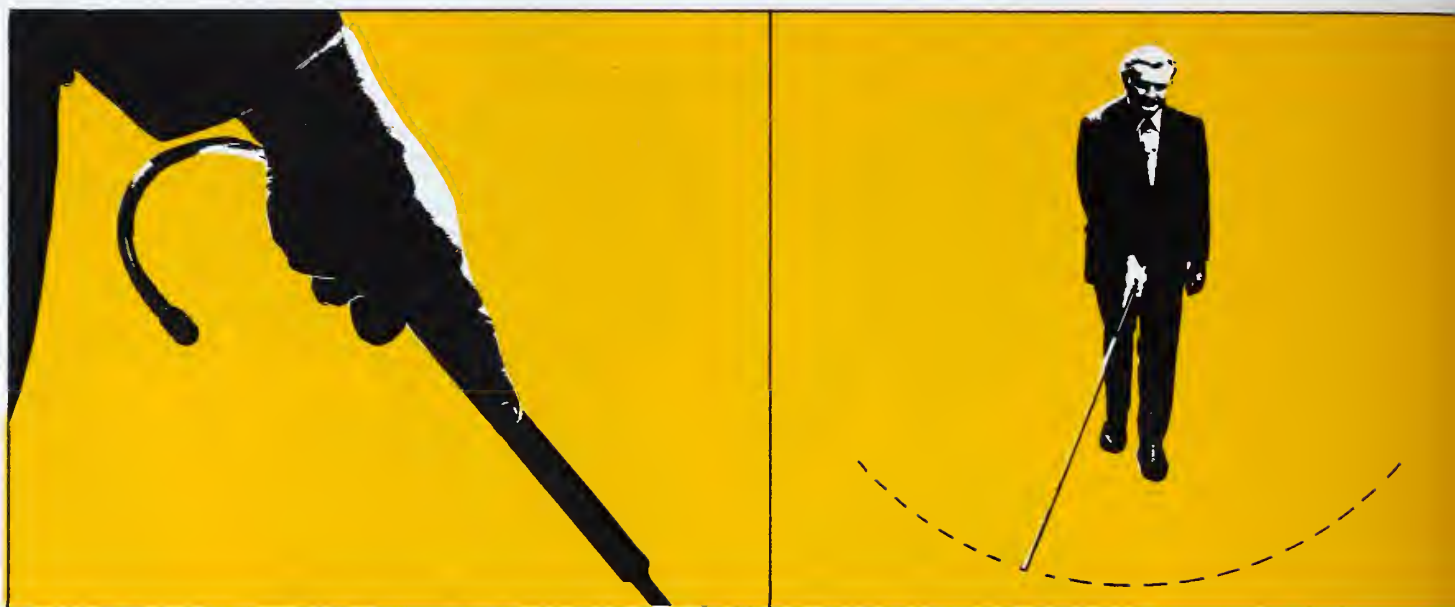
It is very important that a sighted person who wants to assist someone with a dog guide ask him first whether he wants it. Never take a dog user's left arm while he is holding the harness or try to pet or otherwise distract a dog on duty. Either action could upset the dog.

Although the image of a blind person with a dog guide is very familiar, only about one percent of the blind population actually use a dog. To qualify for one a person must be between the ages of 16 and 55 (with a few exceptions based on individual circumstances), be in good health, have good hearing and at least average intelligence, and possess the temperament and emotional stability to maintain a working relationship with the dog and be responsible for it. He must be totally blind or without any useful vision that might interfere with reliance on the dog. According to most authorities, children do not usually have the maturity required and the elderly may not have the physical strength or the good health necessary to handle a dog who walks at a speed of three to three and one-half miles per hour and requires daily airing, exercise, grooming, and use as a guide. Many people who meet the criteria simply do not like dogs or feel a dog would not fit into their lifestyle.

## **The long cane**

The most common means of travel for the majority of visually handicapped people is the long cane, or prescription cane, used in a systematic way. The prescription cane has been used with varying degrees of success by blind people who are deaf, or mentally retarded, by amputees and the elderly, and, of course, by those who are healthy adults and adolescents. Cane techniques can be learned to a greater or lesser degree by most people.

The prescription cane is an aluminum or fiberglass shaft approximately one half inch in diameter. One commonly used model has a crook handle and a golf club-type grip which is flat on one side and rounded on the others, a reflecting material stretching partway along the shaft, and a replaceable steel or nylon tip. The cane is individually prescribed by the mobility specialist because the length is determined by the



user's height, the length of his stride, and his comfort. This is why it is called the prescription cane.

The basic technique of cane travel involves the rhythmic movement of the cane in an arc in front of the body, assuring a safe space for the next foot-step. This sounds deceptively easy, but in most cases it is only with proper orientation and mobility training and constant alertness to the environmental cues picked up through his senses and his cane, that a blind person can proceed safely, step-by-step from one place to another.

Some people prefer the shorter collapsible, folding or telescopic canes made of aluminum, fiberglass, or wood. Some of these canes have completely rounded grips, some have crook handles, some are straight shafts with the grip at the top and a wrist loop. Whatever their modifications, the techniques for using them are the same. At this time they are neither as durable or as reliable as the long cane, though they are less obtrusive and can be slipped into a purse or pocket. On occasions such as parties or concerts some long cane and dog guide users will switch to a folding cane, especially if accompanied by a sighted person. It should be noted here that it is not always possible to use proper mobility techniques with collapsible canes since they are often shorter than prescription length.

### **What is orientation and mobility training?**

It is the part of a blind person's rehabilitation or education that prepares him to travel independently. Its components are the training of the senses; concept development (a particular problem for those who have never seen); self-confidence; the acquisition of motor skills; mastery of the techniques of orienting oneself to one's surroundings and of movement and self-protection in a limited, usually indoor, environment; the use of a human guide; and learning the skills and techniques required for travel with the long cane.

Programs may vary from one agency to another and from one school for the blind to another. Training is individualized and consists of those components prescribed by the mobility specialist; it is started at the point in the person's education or rehabilitation when he is considered ready for it.

The goal of all programs is the achievement of as much mobility as is possible according to the capabilities and desires of the individual. The fundamental building block is the development of the student's confidence, first in the mobility specialist,





then in his own ability to use his other senses and to learn to get around on his own.

The program described here is not that of a particular organization, but a composite. Orientation and mobility training for children involves the same elements, but the teaching methods, pace, and immediate goals are geared to their age levels, abilities, and interests.

Sensory training involves exercises with correction and feedback from the instructor to sharpen the blind person's awareness of what he is perceiving and to enable him to make maximum use of these perceptions. For the adventitious blind, it serves to reorganize the sensorium or central sense from its former, totally visual orientation to its new auditory-tactual framework.

"Before I started training I didn't know what a street was." This statement by a congenitally blind young woman is not that unusual and reflects the elementary level at which concept development may begin. Some important aspects of this process are an understanding of spatial concepts such as parallel and perpendicular; the identification of things in relation to oneself—left, right, above, below, in front of, behind; knowledge of one's own position and the position of other things in reference to a particular landmark; understanding the concepts of organized structures such as the square as a city block, the grid pattern of a downtown area, or the layout of a square building; and knowledge of compass directions.

Generally speaking, an adventitiously blinded person's ability to visualize an intersection, two-way traffic, buses, the physical layout of the community, etc., may preclude the necessity for concept development. However, poor posture, awkward gait, and other physical traits often found in blind persons may sooner or later occur in a newly blind individual if he does not have regular physical activity. Consequently the development of motor skills is vital for all. It may begin with the basics of body movement—identification of body parts, correct posture and walking, improvement of coordination through running, jumping, walking on tiptoe, and other exercises. In some cases, severely visually handicapped people may also require some or all aspects of orientation and basic mobility training.

Mobility lessons are given on a one-to-one basis by the mobility specialist. The student learns to use objects in the environment and a variety of techniques both to gain information and to protect himself. These fundamentals are taught first in restricted situations and later applied to complex outdoor situations.

# Getting around indoors...



Landmarks are known objects in specific places that let a person know where he is—a table against the living room wall, the heat of the sun coming through the dining room window, the clock ticking on the kitchen wall, the smell of the rose bush in the front yard.

Shorelines are the edges formed where two surfaces meet—the rug and the floor, the door and the wall, the floor and the wall, the sidewalk and grass, grass and dirt.

Trailing is the use of the hand (or cane) to follow a shoreline, wall, or hedge. It is used to detect familiar landmarks, determine a sense of direction, and move in a parallel line. To prevent injury to the fingers when the hand is trailing, the person moves the back of his hand along the surface, keeping his fingers cupped in his palm.

Squaring off is lining oneself up in relation to a particular object to ascertain direction or location. A person sitting at his desk may touch the desk to determine that it is directly in front of him, knowing that the door is therefore at a 45-degree angle to the right. At a street corner he feels the edge of the curb with his cane and squares off to cross straight ahead.

The hand and forearm technique is the placing of one arm horizontally in front of the body, chest high, elbow at a 90-degree angle, palm down and fingers slightly curved inward to avoid bumping into such things as partially open doors, furniture carelessly moved about, and other obstacles. Additional protection is afforded by extending the other hand downward to detect lower obstacles.

Next comes training in the use of a sighted guide indoors, on the street, going through a doorway, up and down stairs, and in various situations outdoors. There are many times during the day, even for independent travelers, when cane skills are not called for, when only those described to this point are required.

These mastered, cane travel is begun. Here, as in all aspects of mobility, training is sequential, building upon each skill until it is adequately mastered, then progressing to the next. Once the cane is prescribed, the student learns to hold it correctly—in his right hand if he is right-handed, in his left if he is left-handed.

He grasps the grip on the rounded side, pointing his index finger straight down the flat side, the cane becoming, in essence, an extension of his pointed finger. He holds the cane in front of the midline of his body, elbow in by the side close enough to hold a book securely, lower arm angled downward in a stationary position. As he walks, he flicks the cane from side to side with his wrist in alternate time with his foot so that the





## ...and outdoors

cane is carving out an area of safety for the next step. As the cane touches the ground at a point about one inch to the left of the left shoulder, the right foot moves into the area just scanned by the cane. As the cane moves back across the body and touches the ground to the right of the right shoulder, the left foot steps ahead.

A blind person learns first to get around indoors, perhaps starting by walking along a corridor toward the voice of the mobility specialist who is standing in front of him directing his movement. When the student becomes confused he seeks the shoreline of the wall and floor with his cane and trails along the wall with the cane. As his confidence increases, he learns to turn corners, to enter other rooms, to go up stairs holding the cane straight in front of him and letting it touch the step ahead, and to go down stairs extending the cane to the step below.

Outdoors he learns to walk on the sidewalk while absorbing the myriad cues received through his senses and his cane. The instructor familiarizes him with the route to be traveled by describing the features of the terrain, the landmarks, obstacles (such as the bike rack in front of the bank and the broken sidewalk at the corner), and then accompanies him time after time until he can travel the route without assistance. Once the student has learned to cross streets, the world beyond the block opens up to him. Progressively, he learns to get around his home area, the business district or shopping center or campus. He shops in department stores, uses escalators, goes through revolving doors, and travels on buses and subways and in taxis. He learns how to travel under difficult weather conditions. Rain makes the ground slippery and softens the sounds of the cane and footsteps. An open umbrella causes an echo from the sound reflected by it. Snow is more hazardous because it masks ordinary sounds and covers familiar landmarks. He learns to ask for help when he needs it and to apply what he has learned to going to new and unfamiliar places. When training is completed, the person is usually a safe traveler and the choices of going where, how, and when he wants to are his own.

### **Inside public buildings**

The sounds of voices at different levels and the noise of ascending footsteps indicate stairs. Both sound and touch change as the cane moves from the marble floor to the metal plate of an escalator. Echo perception may indicate a corridor off a large interior space.



### **In an unfamiliar place**

The most efficient way is to learn as much as possible about the area by going with a sighted person who can point out the landmarks and obstacles and fully describe the route. Sometimes it will take more than one trip for a person to become familiar with the area, particularly if it is large and there are confusing traffic patterns, construction hazards, or large areas of grass or other open space, such as a parking lot. During the familiarization trips with the sighted guide, the blind person tries to make a mental map constructed from the cues and landmarks he perceives and those described to him.

### **Getting in and out of cars**

A blind person will probably prefer to get in and out by himself. He can determine which way the car is facing by touching the door and thus find the door handle, opening it himself. With one hand he touches the edge of the roof to determine its height; with the other he reaches in and locates the seat. Once this is done, he can slide easily into place. He then puts his cane between the seat and the door. Or, if he has a dog guide, it then climbs in and sits at his feet. Getting out of the car, the person opens the door, puts the cane out or lets the dog out, and, with the other hand again checking the height of the roof, he ducks out under it.

### **On the street**

On the sidewalk a blind person may use the sounds of parallel traffic to judge his distance from the street. As he walks he can determine whether he is on an asphalt or concrete sidewalk by the type and texture of the sounds made by his shoes and cane and the pressure on the soles of his feet. He hears the sounds of traffic and the direction in which it is moving, the noises of machinery, the sounds of people walking in and out of shops. Landmarks may be the smell of hamburger from the restaurant's exhaust fan or the stench from the uncovered garbage cans that stand uncollected. The sun's radiation helps him orient himself in terms of direction. The abrupt absence of the sun's heat may indicate a marquee or a canopy overhead. A drop in temperature to the side may indicate an alley between buildings.

As he approaches a corner he hears perpendicular as well as parallel traffic and, by sensing a change in sound and wind, notes that he has passed the end of a row of





buildings and is close to the corner. Sometimes he hears the nearby voices of other people waiting to cross the street, but he avoids taking his cues from the sounds of pedestrians because they might be jaywalking, which for him could be extremely dangerous. Instead, he stops, squares off, and listens for the parallel traffic to start and the perpendicular traffic to stop. When this happens, he steps down (looking straight ahead in order not to convey the impression that he can see and is watching the traffic) and crosses the street. At the other side he feels and hears his cane touch the curb, where he steps up and out of the street as soon as possible.

### **On the job**

A newly-employed blind person will have to be oriented to his physical surroundings and learn to get around the building. When he is hired, a supervisor should take him around, introducing him to his co-workers and explaining in detail the area in which he will be working, the location of desks, files, machinery, and fire exits, as well as places through which he will be traveling. It may take the blind person longer to become oriented, but once he has become familiar with the environment, he will use his orientation and mobility skills to get around and freely ask questions when he wants help. If he uses a dog guide, the animal will not interfere with office or factory routine for it has been trained to remain quiet and near its master in a working situation.

### **How can parents help their blind child learn to get around?**

The parents' role is of critical importance. As they overcome the initial shock of learning that their child is blind, they want to do all they can to help him toward a normal life.

A child who has a severe visual impairment may be slower to sit, crawl, and walk alone because he cannot imitate the actions of those around him. He requires extra amounts of stimulation, physical contact, and help and encouragement. A baby can be encouraged to sit by bolstering him with pillows, holding him in a sitting position and by showing him how to grip your fingers as you slowly raise him up. He can be helped toward walking by facing him and talking to him as he comes toward you. These are things parents do with all children. Blind children require them more.

A blind child may be slower at developing concepts. He should be encouraged and stimulated to explore, to touch, to feel, to smell. Each learning experience will help with his adjustment to life and school.

As a child goes through elementary school he should become adept at using sen-



sory cues, develop concepts of place, learn to use a human guide, and master pre-cane techniques. Many blind children are ready for cane travel before adolescence.

All too frequently, however, parents' concern for their blind child's safety leads to overprotectiveness and a reluctance to permit him to travel independently even after the completion of mobility training. Parents should be encouraged to have confidence in the mobility instructor's professional judgment of their child's maturity, his travel readiness and skills.

A young blind woman explained the difficulty. "They do have a tendency to be frightened because they're not used to you traveling by yourself. You know, when you're so many years with your family and all of a sudden you're letting go, it's a very big traumatic experience for them as well as it is for you."

### **How did orientation and mobility training develop?**

The opportunity for mobility training has existed for a very short time. Although blind people, since time immemorial, have used rods, staffs, shepherd's crooks, animals, and other people, it was only the occasional blind person who got around at all. Mythology, folklore, and Biblical literature give a few references. The Greek goddess Charicle gave the blind prophet Teiresias a magic staff that guided his steps. Several biblical passages allude to "groping like blind men." The Talmud tells of a Rabbi Sheisheth who got about by himself with a cane.

Several nineteenth-century accounts exist of people training dogs, but success in such self-taught techniques was rare. Perhaps the most extraordinary pre-twentieth century traveler was Englishman James Holman who, after losing his sight, travelled around the world, hiring guides as he arrived in new places. He wrote seven travel books, but acknowledged some hair-raising difficulties in getting around alone.

Although Johann Wilhelm Klein of Vienna in 1819 argued for the training of dogs as guides and the Englishman W. Hanks Levy in 1872 suggested the advantages of training blind people to use canes, it was well into the twentieth century before serious and systematic efforts were undertaken to afford blind people safe, reliable, and graceful means of travel. And the two landmark developments in mobility—the dog guide and the long cane—came into existence in the aftermath of war for the rehabilitation of war-blinded servicemen.

During World War I, the German Army trained dogs to carry messages and perform other specialized tasks. In 1915 a program was started to adapt the training to enable



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the dogs to guide veterans. By 1923 the first major dog guide center was established in Potsdam and in 1929 the first school was opened in the United States. As of 1973 there are nine dog guide schools in this country.

In 1930 the Lions Club of Peoria, Illinois, successfully lobbied for the first "White Cane Law" giving the right of way at intersections to blind people carrying a white wooden cane with a red tip. The following year the Lions Clubs adopted a national white cane program and have since distributed thousands of white canes free. The white cane is cumbersome, fatiguing, and of limited use in conveying information about the environment. It serves principally to identify the user as a blind person for his own safety and protection, but until the development and widespread use of the prescription cane, it did enable some blind people to move about somewhat more freely than before.

Concern for the blinded servicemen of World War II led the U.S. military to establish rehabilitation programs at four hospitals. One was Valley Forge General Hospital in Phoenixville, Pennsylvania. There Sergeant, later Lieutenant and now a renowned ophthalmologist, Richard E. Hoover, who was working in the program as director of physical reconditioning, orientation, and recreation, watched the men shuffling along the corridors with their wooden canes, moving awkwardly, traveling poorly. He determined that what they needed was not a short heavy cane to sustain their weight, but rather an antenna that would extend their reach and pick up cues from the environment. He and his team began experimenting with longer, lightweight sticks and came up with the prototype of the long cane and the set of techniques, centered on holding the cane in front of the body instead of by the side, that are the basis of today's mobility programs.

By the time the program was transferred to the Veterans Administration Hospital at Hines, Illinois, word of its achievement was spreading. Agencies began sending staff members to Hines for brief observation periods. The hospital offered short courses, not designed to qualify the observers, but rather to acquaint the field with the possibilities for independent mobility.

Faced with a growing demand for mobility training, a number of agencies did set up mobility programs with various staff members as instructors. The approach was largely ineffective because there was so little knowledge of the methods used in such training.

In 1959 a conference cosponsored by the Office of Vocational Rehabilitation (now

the Social and Rehabilitation Service of the U.S. Department of Health, Education, and Welfare) and the American Foundation for the Blind developed basic criteria for mobility instructors—that they be sighted and that their instruction be taken at the graduate level for at least one year—and an outline for a curriculum for this training. This led directly to the development of training programs for mobility specialists in universities. In 1960 Boston College established a graduate Peripatology Program and the following year Western Michigan University opened its Center for Orientation and Mobility. By 1973 eight colleges and universities had inaugurated graduate or undergraduate programs to prepare orientation and mobility instructors. These programs include course work in education, the behavioral and physical sciences, the functions of the senses and the effects of impairments on them, preventive and restorative resources, and actual training while blind-folded.

Many instructors previously in the field have taken additional training to update their knowledge. To insure professionalism among mobility specialists, the American Association of Workers for the Blind certifies those who are qualified. Most are employed by agencies and schools for the blind and other institutions serving blind people.

A noteworthy development is the extension of professional mobility instruction beyond the agencies and schools for the blind, reflected by the hiring of mobility instructors in large public school systems and the establishment of private firms that offer their services on a contract basis to nursing homes, hospitals, and other institutions that would not have enough demand for their own staff instructor.

Consideration is now being given to the training of paraprofessionals to carry out particular aspects of mobility instruction under the direction of qualified mobility specialists.



# What about the future?



A major trend that has attracted increasing attention is the application of technological advances, particularly miniaturization, to finding solutions to the problems of mobility, to the development of tactual and auditory maps designed to meet the needs of blind travelers, and to the further refinement of canes. Another is the call for extending orientation and mobility training to the visually handicapped who have not in the past had much opportunity for it—the aging, the multiply handicapped, and young children.

Experimenters have utilized nearly every part of the electromagnetic spectrum—from ambient light to infrared to ultrasonic energy—to design probing instruments that would be relatively simple and unobtrusive yet convey significant information about the environment. Some of these devices are in the early stages of design, others have undergone field testing and are being modified. None is available for general distribution, nor is any one of them the ideal solution for all visually handicapped people. Most are designed for use in conjunction with the cane or dog, not as replacements for either. Some have been given a measure of publicity. Among them are:

1. The Kay binaural sensor is an ultrasonic transmitter-receiver device mounted in a pair of spectacles that have special nonoccluding ear molds for receiving signals reflected from objects in the environment. It is connected to a power supply that can be carried in the pocket. Through training, the user learns to differentiate the sound of a brick wall from the sound of a tree or metal garbage can, yet still hear the other sounds and noises around him. Effective for detecting overhanging objects and obstacles up to 15-20 feet away, it is used with a cane or a dog. A variation of the spectacle housing idea, but one using infrared waves, is also being tested.

2. The laser cane is a specially designed long cane which emits pencil-thin beams of colorless light to detect head-high objects, objects up to 20 feet ahead, and changes in the terrain, such as drop-offs, curbs, and manholes. It alerts the user by means of vibrating pins or a pin and audible signals. Through it the user can find a safe travel path, but it does not provide the wealth of detail about the texture and structure of the environment that the binaural sensor does.

3. The Russell Pathsounder is an ultrasonic device in a small box worn on a neck strap that warns of waist-high objects up to a distance of about six feet. It is not intended for dog guide users.

4. The Bliss Passive Detector is a flashlight-type device that converts optical images

into audible signals or vibrations. It has evolved from a reading aid.

The American Foundation for the Blind in 1971 established the Sensory Aids Development Program to act as a clearinghouse for information on sensory aids, including those for mobility, and as a catalyst for the testing, evaluation, development, and marketing of aids.

Two other approaches that are radically different from those described above are the areas of vision substitution and artificial vision. Vision substitution would involve a tiny TV camera which could be mounted on spectacles. The optical image from the TV camera would be transmitted to a device which would analyze the image and transform it into electrical impulses which are in turn transmitted to a waist-encircling cummerbund device containing thousands of stimulation points. These pain-free electrical impulses recreate on the skin a tactile display of the optical image. What will be the practical value of this idea is as yet undetermined.

Artificial vision would also involve a tiny TV camera mounted on spectacles connected to a device which would analyze the image. The electrical impulses, however, would be transmitted to an array of electrodes located under the skull and in contact with the visual center of the brain itself, at the back of the head. There are many obstacles to the development of such a system, including determining the best kinds of signals, the strength of such signals, and the tolerance of the brain tissues for the electrode array.

While some of these approaches sound promising and should be pursued diligently, it is not realistic to expect that any or all of them will in the near future meet the mobility needs of the great majority of visually impaired people. What can immediately help meet these needs is a combination of extending orientation and mobility training to more and more blind persons, the improvement of canes, and more useful orientation devices such as maps. In the latter area there are several noteworthy developments.

While blind people generally make mental maps of known routes and some use braille maps consisting of sequential lists of landmarks and directions, these are subjective and not necessarily reliable. Experimentation is now underway to produce lightweight, durable, inexpensive tactual maps that contain the information blind people need—for example, lamp posts, mailboxes, and other potential hazards—in a clear, uncluttered symbolic form. The other area of map research is auditory maps, verbal descriptions of particular routes or geographic areas on cassette tapes. Easily portable auditory maps can also include the sounds of auditory landmarks. Tactual and auditory maps can be used together or separately. Both are geared for those who have undergone mobility training and are competent travelers.

It is hoped that more visually handicapped people will seek out orientation and mobility training so that the choice of going where, when, and how they want to go can be theirs.



## **Free Publications of the American Foundation for the Blind That May Be of Interest to You**

Aids & Appliances Catalog

Dog Guides for the Blind

Is Your Child Blind?

What to Do When You See a Blind Person (And What Not to Do)

When You've Hired a Blind Person

Complete bibliographies on orientation and mobility are also available free of charge from the M.C. Migel Memorial Library, American Foundation for the Blind, 15 West 16th Street, New York, New York 10011.

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